

In the Drawing:

Please accept the accompanying four replacement sheets filed to overcome the objection to the figures.

REMARKS

This is a request for reconsideration and amendment after final action filed under 37 C.F.R. 1.116. No changes have been made in the claims. However replacement figures have been filed to overcome the objection to the drawing.

I. OBJECTION TO THE DRAWING

The drawing figures were objected to because of lines, letters and numbers were not well defined. Indeed some letters and lines were drawing by hand.

Replacement sheets containing replacements for the four figures accompany this request for reconsideration. The four replacement figures were drawn with the aid of the computer word processor's drawing commands and are thus machine-made, so that the lines, letters and numbers are well defined. However the subject matter in the figures is unchanged, although portions of the figures have been rearranged.

Approval of the new figures and withdrawal of the objection to the drawing is respectfully requested.

II. ANTICIPATION REJECTION

Claims 29 to 30, 39 to 40 and 45 were rejected under 35 U.S.C. 102 (e) as anticipated by Antonio, et al (US 6,519,456 B2) (called "Antonio" below).

1. Radio Station Claims 29 and 30

The subject matter of Antonio includes a base station, which is segmented into several sectors with the help of directional antennas, in order to increase the capacity of a cell (column 2, lines 25 to 29). Conventional base stations, like that of Antonio, typically use three such sectors, wherein each sector antenna covers an angular region of 120°. In a CDMA system each sector operates from the standpoint of the network as an independent base station. The purpose of the invention of Antonio is to increase the number of sectors in the base station architecture, in order to improve the system capacity (column 2, lines 30 to 36). Thus a so-called soft-handoff can take place in forward transmission with a mobile subscriber, in which the connection of the mobile subscriber or station with the base station is switched between a first and second forward channel of the base station (column 3, lines 67 to column 4, line 17). While the soft-handoff between the sectors of a base station occurs, the communication in both forward channels takes place simultaneously with the mobile subscriber unit (column 3, lines 50 to 51). This soft-handoff is in contrast to the so-called hard-handoff, in

which the connection of the mobile unit with the first base station is terminated (column 2, lines 3 to 8).

As already described in Antonio the different sectors of the base station are viewed only as individual base stations and thus are independent of each other. In this context the base station architecture is also understood in accordance with figure 5 of this reference. The base station architecture includes three transmitter modules, which each have a single sector. The transmitter modules are shown as completely independent of each other as in fig. 5. That means that the respective modulator 114 of the individual transmitter modules TM1, TM2, TM3 is responsible only for the signal transmissions in the corresponding sector, not however for the transmission of signals in other sectors. When a channel is simultaneously set up to one and the same mobile subscriber unit during soft handoff of two sectors of the base station, thus each of these channels is supplied with signals from a separate modulator in the associated sector of the base station. That means that, in contrast to the current claim 29, in the system of the reference Antonio there is no single modulator, which supplies plural or several antennas and thus several radio channels with coded and pre-equalized radio signals to one and the same subscriber station. Each of the modulators 114 in fig. 5 of D1 always supplies only one sector antenna and thus only a single radio channel to the mobile subscriber unit – with coded pre-equalized signals. Thus in contrast to claim 29 the pre-equalization disclosed in the reference is not a pre-equalization depending on all actually

used codes and on the transmission properties of all actually used radio channels.

According to the architecture shown in figure 5 of Antonio the modulator 114 can only consider the transmission properties and codes of the signals propagated by the single associated sector antenna, not however the codes and transmission properties of the signals propagated by the neighboring sector antennas. The explanations or reasoning in the Office Action regarding the unshown embodiment with the IIR filters (column 12, lines 13 to 17) contradicts the base station architecture shown in fig. 5 of the Antonio reference.

Furthermore no claim in Antonio includes the feature that the [single] means for pre-equalization [or modulator] [for all channels] of the radio signals to be transmitted over the antennas performs the pre-equalization according to all actually used codes and transmission properties of all actually used radio channels. The claims of Antonio describe a basic method for soft-handoff including receiving a transmission from the mobile subscriber on a reverse channel, assigning a voice address (designating the subscriber) to a first and second modulators corresponding to first and second channels and then filtering forward link communications to select only the communications associated with the voice address for transmission over the first and second channels(claim1).

Also the disclosure in column 12, lines 13 to 17, of Antonio does not include the distinguishing feature in the last paragraph of claim 29. Where is the disclosure that states the spreaders 252 obtain information from other sectors and other modulators? If other references, such as IS-95 and IS-97 (column 12,

lines 13 to 17), disclose or suggest the key distinguishing feature in the last paragraph of claim 29, they should at least be cited in the Office Action and copies of these references provided to applicants. Then of course if other references are needed, the anticipation rejection should be withdrawn.

The subject matter of claim 29 is neither anticipated nor obvious from Antonio alone. Thus claim 30 should not be rejected as anticipated by Antonio.

2. Method Claims 39 to 40 and 45

Independent claim 39 contains the same distinguishing feature in its last paragraph as claim 29. Claims 40 and 45 depend on claim 39. Thus claim 39 is not anticipated by Antonio for the same reason as claim 29.

Regarding claim 39 the Office Action asserts that Antonio discloses the feature "transmitting set pre-equalized signals from the first radio station over each of the plural radio channels (20, 25) to the second radio station". As previously mentioned it is indeed correct that the CDMA system described in Antonio performs a soft handoff, in which the mobile station simultaneously receives signals from more than one channel from different sectors of one and the same base station. However according to Antonio and in contrast to the subject matter of claim 39 these signals are not pre-equalized by a single modulator or single means for pre-equalization for all signals, but instead for each sector by a separate modulator for each sector (Fig. 5 of Antonio). Thus Antonio in contrast to the statements in the Office Action does not disclose the feature in the last paragraph of the pending claim 39, in which the pre-

equalization is performed in the single modulator of the first radio station according to all different codes and depending on the transmission properties of all radio channels and the additional channels.

Starting from the understanding that an individual or separate modulator is provided for each sector, as described in the subject matter of Antonio (e.g. fig. 5), this modulator and the IIR filter associated with it only performs a pre-equalization for the radio channel defined by the associated sector antenna. Thus in contrast to the subject matter of claim 39 the pre-equalization of the reference does not consider the transmission properties and codes of the radio channels of the other sectors.

Thus the subject matter of the pending claim 39 is neither anticipated nor obvious from the subject matter of Antonio. Also claims 40 and 45, which depend directly on claim 39, should not be rejected as anticipated or obvious from Antonio.

For the foregoing reasons withdrawal of the rejection of claims 29 to 30, 39 to 40 and 45 under 35 U.S.C. 102 (e) as anticipated by Antonio, et al, is respectfully requested.

III. OBVIOUSNESS REJECTIONS

1. Method Claims 31 to 32, 35 and 42

Claims 31 to 32, 35 and 42 were rejected under 35 U.S.C. 103 (a) as obvious over Antonio, et al, in view of Karlsson, et al. (referred to below as "Karlsson").

The above argumentation is also valid for the rejection of Independent method claim 31, the claims that depend on claim 31 and also claim 42. Step d) of claim 31 requires that an estimate of the total impulse response of all radio channels is made. The last paragraph of claim 31 requires that the pre-equalization is performed by a single modulator according to the estimate of the total impulse response of all radio channels. Neither Antonio nor Karlsson teach or suggest these features.

According to applicants' invention as claimed in claim 31 a single modulator performs a pre-equalization of signals transmitted over several channels in contrast to the arrangement disclosed in Antonio, as explained above, in which a separate or individual modulator is provided for each sector of the base station, wherein a respective single radio channel to the mobile subscriber unit is set up during soft-handoff of two sectors of the base station. For the above-described reasons the last feature of the pending claim 31, the pre-equalization of the radio signals is performed by the modulator depending on the estimate of the total impulse response, is not disclosed or suggested by

Antonio.

As admitted on page 4 of the Office Action, Karlsson does not even disclose transmitting signals from a single base station to a single mobile station via plural radio channels, so that Karlsson could not disclose or suggest the key distinguishing features in step d) and the last paragraph of claim 31. Karlsson was cited for different reasons. Karlsson does not suggest performing a pre-equalization of all the plural channels connecting the base station and mobile station because there is only one channel connecting them according to Karlsson.

Thus the combination of Antonio and Karlsson cannot suggest the subject matter of claim 31 because the modifications of the disclosures in these references that are necessary to obtain the claimed subject matter are not suggested. Simply stated, one skilled in the art would not find a suggestion of the key distinguishing features of claim 31 in either reference.

For the foregoing reasons withdrawal of the rejection of claims 31 to 32, 35 and 42 under 35 U.S.C. 103 (a) as obvious over Antonio, et al, in view of Karlsson, et al, is respectfully requested.

2. Claims 33 to 34, 36 to 38 and 43 to 44

Claims 33 to 34, 36 to 38 and 43 to 44 were rejected under 35 U.S.C. 103 (a) as obvious over Antonio, et al, in view of Karlsson, et al. (referred to below as "Karlsson"), and further in view of Zhuang, et al (referred to below as "Zhuang").

It is respectfully submitted that Zhuang cannot be combined with Antonio

and Karlsson under 35 U.S.C. 103 (a) for reasons set forth further hereinbelow.

A. Mobile Station Claim 37

Mobile station claim 37 claims a mobile station with two antennas for receiving and transmitting radio signals for corresponding radio channels 20,25 from and to another radio station and includes means for transmitting weighted reference signals multiplied with coefficients assigned to the two antennas, etc.

Karlsson does not teach that reference signals are transmitted from the base station to the mobile or subscriber station and that the reference signals are weighted multiplicatively with associated coefficients corresponding to the respective radio channels in the base station and the signals received over the radio channels are weighted with the same coefficients in the receiving station. Karlsson not only does not teach that the base station transmits reference signals, which are weighted multiplicatively with associated coefficients for each radio channel, but also does not disclose that the signals received over the radio channels by the radio station are weighted with the same coefficients in the receiving station.

These features that are pointed out in the above paragraph, which are present in the pending claim 37 and missing in the reference, provide an important advantage because a directional action or characteristic of the signals received or propagated by the antenna of the base station is obtained. Because of the weighting of the reference signals transmitted from the radio station it can be guaranteed that during pre-equalization of the signals transmitted from the

second radio station to the receiving station, all radio channels between both radio stations will be considered, also the described directional action is taken into account. The attainment of this sort of directional interaction between the antennas of both radio stations communicating with each other is not obvious from any of the cited references.

The assertion in the Office Action that the weighting process is also used for the transmitted signals in the case of Karlsson because of bidirectionality of the communication channel between the mobile station and the base station is without basis. Also Karlsson does not provide any hint or suggestion so that one skilled in the art could arrive at this feature.

Finally the weighting of the received signals in the method disclosed in Karlsson is for the purpose of suppressing interference in the receiver. The transmission of the weighted signals, which are produced for suppressing interference in the receiver of Karlsson, from the radio station of Karlsson is not disclosed in the reference and would be completely superfluous. It would have hardly any effect or result so that it is not understood why the additional work for weighting the signals to be transmitted would be performed in the mobile station of Karlsson.

Furthermore Zhuang does not explicitly disclose that reference signals multiplied by weighting factors are transmitted.

Furthermore, the combination of the disclosures of Karlsson and Zhuang in the manner suggested in Office Action to obtain the claimed invention according to claim 37 is not permissible, because they describe entirely different

methods for interference suppression. While the reference Karlsson suppresses intersymbol interference (ISI) because it suitably weights received signals from several antennae, the Zhuang reference suppresses such intersymbol interference (ISI) because the channel impulse response is estimated in the receiver. The estimation of channel impulse response according to Zhuang and the weighting of the signals received by several antennas according to Karlsson are completely different methods for suppression of interference in a receiver.

It is well established that references must be combinable under 35 U.S.C. 103 (a) for a valid obviousness rejection. For example, the Federal Circuit Court of Appeals has said:

"Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103 teachings of references can be combined only if there is some suggestion or incentive to do so." *In re Fritch*, 23 U.S.P.Q.2d 1780, 1783(C.A.F.C., 1992).

Since the references describe entirely different methods of suppressing interference one skilled in the art would not be motivated to select features from one reference (Zhuang) for use in the method of the other reference (Karlsson). Also, as indicated above in connection with the anticipation rejection, Antonio does not involve an estimation of the total impulse response of all linking channels and includes contradictory teaching, so that the alleged motivating factor for the proposed combination, as stated in the last full paragraph on page 18 of the Office Action, is lacking.

The position taken in the Office Action regarding Zhuang concerns the reduction of ISI for the "reverse link" from the mobile station to the base station. That means that the base station receives a signal with interference from the mobile station and suppresses the interference according to the estimation of the channel impulse response. However in contrast to the opinion in the Office Action and the citations there Zhuang does not disclose that the base station receives a reference signal transmitted at the mobile station. Only the reception direction is considered in Zhuang at the place cited, just like in Karlsson. For this purpose a reference signal can be received by the base station, which however is not disclosed in reference Zhuang. However Zhuang does not disclose the feature involving transmission of the reference signals as claimed in claim 37.

Thus the pending claim 37 is not obvious from a combination of the references Antonio, Karlsson and Zhuang.

B. Base station claim 38

Base station claim 38 includes the distinguishing features described above, namely that the base station contains a single modulator including a measure for pre-equalization and that the base station includes a means for performing an estimate of the total impulse response of all of the radio channels and that the means for pre-equalization performs the pre-equalization according to the estimate of the total impulse response of all of the radio channels. Thus, as far as a combination of Antonio and Karlsson goes, without Zhuang, the same argumentation present above in the other sections regarding the other claims

applies.

Zhuang, section II, lines 5 to 9, is cited in the Office Action for disclosing one of the features of pending base station claim 38, namely that an estimation of the total impulse response of the radio channel depends on the respective reference signals, which are received from the second radio station or mobile station over the radio channels. At this cited location in Zhuang the Office Action continues by stating that the reduction of the ISI in reception in the base station is based on the estimate of the channel impulse response. Zhuang does not disclose the combination or superposition of the reference signals. Based on that the estimate of the channel impulse response described in Zhuang serves for pre-equalization of the data received by the base station and not pre-equalization of the data to be sent from it. In contrast to the subject matter of the pending claim 38 (paragraph 2 of claim 38 .. "means for transmitting pre-equalized..."). Thus Zhuang cannot be combined with Antonio, in which a combined pre-equalization takes place.

Furthermore as noted above Zhuang, which is used by the Examiner regarding claim 38 for reception by means of several antennas, may not be combined with Karlsson for the reasons described for claim 37. The reason is because Zhuang relates to an entirely different concept for suppression of ISI without use of weighting factors in contrast to that used in Karlsson.

Thus claim 38 is not obvious from a combination of Antonio, Karlsson and Zhuang.

C. Dependent Method claims 33, 34, 35, 36, 43, 44

These claims generally limit the independent claims to a method in which reference signals are transmitted over the reverse link from the mobile station 2 to the base station 1. Thus the argumentation used to overcome the rejection of mobile station claim 37 applies here as well as the argumentation for allowance of the independent claim on which they depend.

For the foregoing reasons withdrawal of the rejection of claims 33 to 34, 36 to 38 and 43 to 44 under 35 U.S.C. 103 (a) as obvious over Antonio, et al, in view of Karlsson, et al, and further in view of Zhuang, et al, is respectfully requested.

3. Claim 41

Claim 41 was rejected under 35 U.S.C. 103 (a) as obvious over Antonio, et al, in view of Zhuang, et al.

Method claim 41 depends on claims 40 and 39 wherein were rejected as anticipated by Antonio. Method claim 41 introduces the feature that respective reference signals are transmitted over the reverse link to the base station from the mobile station.

However the secondary reference, Zhuang, does not disclose the feature related to transmission of the reference signals.

Furthermore regarding claim 39 the Office Action asserts that Antonio discloses the feature "transmitting set pre-equalized signals from the first radio

station over each of the plural radio channels (20, 25) to the second radio station". As previously mentioned it is indeed correct that the CDMA system described in Antonio performs a soft handoff, in which the mobile station simultaneously receives signals from more than one channel from different sectors of one and the same base station. However according to Antonio and in contrast to the subject matter of claim 39 these signals are **not** pre-equalized by a single modulator or single means for pre-equalization for all signals, but instead for each sector by a separate modulator for each sector (Fig. 5 of Antonio).

Not only does Antonio not disclose the feature in the last paragraph of the pending claim 39, which indicates that the pre-equalization is performed in the single modulator of the first radio station according to all different codes and depending on the transmission properties of all radio channels and the additional channels, but Antonio in no way suggests these feature either.

Thus claim 39 is not obvious under 35 U.S.C. 103 (a) from the disclosures in Antonio.

Furthermore Zhuang which does not disclose a method of two-way transmission between a mobile station and a base station via two separate radio channels, certainly does not disclose or suggest pre-equalization performed in a single modulator of the base station according to all different codes and the transmission properties of all of the plural radio channels. The reason is simply that Zhuang does not disclose plural radio channels so that pre-equalization of plural radio channels cannot be disclosed.

Thus Antonio cannot be combined with Zhuang under 35 U.S.C. 103 (a) to

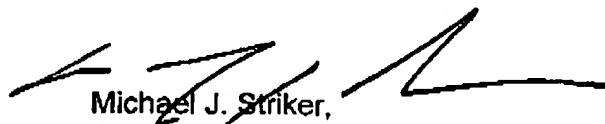
reject claim 39 as obvious and thus the same is true of claim 41, which depends on claim 39.

For the foregoing reasons withdrawal of the rejection of claim 41 under 35 U.S.C. 103 (a) as obvious over Antonio, et al, in view of Zhuang, et al, is respectfully requested.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,



Michael J. Striker,
Attorney for the Applicants

Reg. No. 27,233